

Activity: **3.6**
Determine Project Feasibility

Responsibility: Project Manager/Team

Description: In this stage, the feasibility of successfully developing and implementing the project is determined. Project feasibility leads to a "go" or "no go" decision about the project. Determining project feasibility is an interactive process of collecting and analyzing data and searching for cost-effective, viable technical solutions.

Use the project objectives, scope, and high-level requirements as the basis for determining project feasibility. Work with the user organization and functional area representatives to address technical issues and risks. Conduct research and investigate documents and other resources.

Note: Feasibility may not be an issue for some small software development projects. A Feasibility Review is not required when feasibility is obvious.

Sample Questions: The following is a list of sample questions that can be used to help determine the feasibility of a project.

- Can the users needs/problems best be satisfied with a manual process, automated process, or combination?
- Is it cost-effective to develop an automated process?
- Is the scope of the project feasible within time, resource, and hardware and software constraints and limitations?
- Is there at least one technically feasible automated solution for the project?
 - If a project is well defined and has no automation issues, a single straightforward automated solution may sufficiently demonstrate cost and technical feasibility.
 - Where automation issues have been identified, technical alternatives should be associated with each proposed solution.

Tasks: The following tasks are involved in determining project feasibility.

- 3.6.1 Investigate Software Alternatives
- 3.6.2 Investigate Hardware Alternatives
- 3.6.3 Formulate Platform Options
- 3.6.4 Conduct Feasibility Review
- 3.6.5 Conduct Analysis of Benefits and Costs
- 3.6.6 Conduct Feasibility Study

Task: **3.6.1**
Investigate Software Alternatives

Description: When the software to be used for the project has not been predetermined by the system owner's existing computing environment, software available within the Department and the commercial marketplace should be investigated. In the Planning Stage, the investigation of software alternatives is geared to determining project feasibility.

Unless the cost effectiveness of developing custom-built software to meet mission needs is clear and documented, all sources of reusable code, applications, and commercial off-the-shelf software must be investigated on a site and Departmentwide basis prior to making a decision to custom-build code for the project. This practice ensures the most cost-effective and efficient use of resources, and will decrease the number of duplicative and overlapping software systems. The choice to develop a customized application should be balanced against the availability of other solutions; and the project cost, resources, and time constraints.

Software Alternatives: Information on software products or modules can be obtained by notifying field sites, DOE Headquarters, other Government agencies, and private industry via Internet. The following is a list of software alternatives that should be considered.

- Adapt existing software in use within the Department.
- Adapt existing software in use within other Government agencies.
- Adapt mainframe or minicomputer source code obtained from Departmental Computer Center repositories.
- Purchase commercial off-the-shelf software.
- Reuse existing modules of code.
- Adapt reusable code to fit the new application.
- Develop a custom-built software product.

Exhibit 3.6-1, Checklist for Investigating Software Alternatives, provides a checklist for investigating existing software resources.

Note:

Medium and small software engineering efforts are often restricted to the system owner's existing software. This should not preclude the potential cost savings of reengineering existing software modules rather than custom building the entire software system.

Exhibit 3.6-1. Checklist for Investigating Software Alternatives

Software Resource	Contact	Special Considerations
<p>Review Headquarters software repositories including:</p> <ul style="list-style-type: none"> -Microcomputer and local area network applications in the Microcomputer Application Systems Library (MASL) -Applications in the Systems Review Inventory System (SRIS) 	<ul style="list-style-type: none"> -MASL Coordinator -Administrative Computer Center SRIS listing on HR-01 LAN 	<p>If the requirements are met by reusable software obtained from MASL, SRIS, or SASREPS, then adapting that software may provide the best solution. If the source application is very similar to the target application, was developed to standards, and includes documentation, this can be a very attractive alternative to a custom-built application. Reusable code may be customized to meet specific requirements.</p>
Review field site software repositories	Field site repository owner/coordinator	
Review the Department of Commerce Interagency Survey of Administrative Systems Reporting System (SASREPS)	MASL Coordinator at DOE Headquarters	
Contact other project teams working on similar projects	Project managers	

Exhibit 3.6-1. Checklist for Investigating Software Alternatives

Software Resource	Contact	Special Considerations
Investigate off-the-shelf commercial software	Software vendors	Request and evaluate vendor-supplied demonstrations of software products that may satisfy project requirements. Commercial software may offer a macro language or program code that can be modified by the developer, which can significantly decrease development time. Some disadvantages to commercial software include procurement lead time, developer and user learning curves, and interfaces with existing hardware and software.
Determine software libraries available for particular software languages	Mainframe software administrators Microcomputer software development groups	Reusable code can be either modules of code that are used as written, or units of code that are reengineered to perform a similar function. If the reusable tools for the particular development language are numerous, this alternative may be more attractive than modifying an application that will need considerable customization.
Reuse modules of code or software libraries developed within your functional area	Task leaders and other programmers	Some software engineering teams develop modules of reusable code that are language specific and perform functions such as screen formats, data validation, error-handling, data access, and other frequently used routines. Once developed, tested, and refined, these routines become reliable building blocks for the rapid development of other applications.

Task: **3.6.2**
Investigate Hardware Alternatives

Description: When the hardware to be used for the project has not been predetermined by the system owner's existing computing environment, investigate hardware available within the Department and through the commercial marketplace. In the Planning Stage, the investigation of hardware is geared to determining project feasibility.

Factors to Consider: The following is a list of factors that should be considered when identifying hardware alternatives.

- Availability and cost of hardware
 - Shareable hardware
 - Government excess
 - New procurement
- Current and future telecommunications needs
- Computer security requirements of the system
- Volume of data
- Importance of data to the Departmental mission
- Importance of data to the user organization's mission and to job performance
- Potential growth of the software to serve more users
- Potential growth of the software to serve more locations
- Potential for interface to other systems or organizations
- Conformance to Government standards such as networking and open systems

Note: Medium and small software engineering efforts are often restricted to the system owner's or user sites' existing hardware.

Task:**3.6.3
Formulate Platform Options****Description:**

Use the information collected about software and hardware alternatives to formulate preliminary platform options. The purpose of identifying platform options early in the project lifecycle is to assure that at least one technically feasible and cost-effective approach exists to satisfy the project objectives. If more than one platform option is feasible, identify the benefits, costs, assumptions, constraints, dependencies, and risks associated with each option.

No platform decisions are made at this time. Detailed technical solutions are premature prior to defining the product requirements. The platform alternatives information gathered in the Planning Stage is revisited in the Functional Design Stage, at which time a final recommendation is developed by the project team and presented to the system owner. The system owner is responsible for making the final platform decision.

Work Product:

Develop a summary of platform options for use in the Feasibility Review or Feasibility Study. Place a copy of the platform option information in the Project File.

Review Process:

Conduct a structured walkthrough to ensure that the most viable platform options have been identified.

Task: **3.6.4**
Conduct Feasibility Review

Description: A Feasibility Review is an informal meeting to determine whether the software project can be accomplished with the available resources, system owner and users' computing environment, and technological constraints. The Feasibility Review meeting also provides an opportunity for project management to obtain feedback from other project managers and the functional area representatives who will be providing input to, or supporting, the project throughout the lifecycle.

The project objectives, scope, high-level requirements, and preliminary platform options should be shared with the review meeting participants prior to the meeting date. The participants are expected to evaluate the project information and risks, and make a recommendation about project feasibility.

Feasibility

Factors: The following are some typical factors that should be considered when determining the feasibility of a project.

- Project scope and objectives
- Users' computing environment
- High-level requirements
- Assumptions, constraints, and limitations
- Platform options
- Security and recovery objectives
- Risk factors
- Technological factors
- Available resources and budget
- Future growth needs
- Expected long-term benefits
- Compliance with long-range information resource management plans

Recommendations: After all of the pertinent feasibility factors have been considered, the review meeting participants should make one of the following recommendations:

- Proceed with the project without performing a Feasibility Study
- Prepare an Analysis of Benefits and Costs
- Conduct a Feasibility Study, which includes an Analysis of Benefits and Costs
- Stop the project

Work Products: Generate a record of the Feasibility Review meeting to serve as verification that the review occurred, to record feasibility factors that were considered and the recommendation(s) generated during the meeting, and to provide background information if a Feasibility Study or Analysis of Benefits and Costs is required.

The project manager uses the recommendations from the Feasibility Review meeting to develop a formal statement of feasibility. A typical statement of feasibility is a short declaration describing whether or not it is feasible to develop the project within the known constraints. When major risks are involved in the feasibility decision, it may be necessary to expand the statement of feasibility to describe the risk factors and their consequences.

Depending on the factors that must be considered for each project, the statement of feasibility may contain the following information.

- Project objectives
- Summary of issues concerning:
 - development and implementation
 - assumptions, constraints, and limitations
 - project scope
- Results of research on hardware and software alternatives
- Significant risk factors
- Feasibility recommendation(s)

The project manager decides on the final recommendation and reports the findings to the system owner for review and approval.

Sample Feasibility

Statement: The following is a sample feasibility statement for a low-risk project that would use the hardware/software platform currently available within the users' organization.

The client organization, Project Management Officer, and project manager agree that the XYZ project will be written in {programming language} and use {operating system and/or DBMS} on {hardware configuration}, all of which are currently in place and can easily absorb the impact of XYZ. This will be a custom-built product since a search of software repositories did not reveal any reusable or existing software that would satisfy the project requirements.

Task: **3.6.5**
Conduct Analysis of Benefits and Costs (*as appropriate*)

Description: An Analysis of Benefits and Costs (ABC) is a useful tool in any stage of the software lifecycle. In the Planning Stage, the results of an ABC help to determine the feasibility of a project and the return on investment. For example, an ABC can be conducted to determine if changing the users' current business processes or computing environment will improve efficiency or reduce overhead expenditures enough to justify the cost of the project, and when the system owner can expect to recoup the costs of the project in benefits.

An ABC is used to identify and compare the benefits and costs associated with all of the hardware or software alternatives. Any advantage to a particular alternative is considered a benefit, and any loss or penalty is considered a cost. Costs can also include the purchase price of supplies, equipment, software, personnel time or charge rate, and system downtime. The results of the ABC indicate the most cost-effective alternative.

When a totally manual process is being automated, the benefits of automating the process may be obvious. If the system owner has restricted the platform, then an ABC can be an appropriate way to document these decisions and the benefits and costs associated with the limitations.

When a Feasibility Study is performed, an ABC is a mandatory requirement of the study. When a Feasibility Study is not performed, the ABC is an optional process.

Work Product: Develop a report that describes the results of the ABC. When a Feasibility Study is performed, the results of the ABC will be incorporated into the Feasibility Study Document.

Review Process: An informal peer review or a structured walkthrough is recommended to validate the ABC process used and the results obtained.

Reference: The following Department documents provide guidance on conducting an Analysis of Benefits and Costs.

- Analysis of Benefits and Costs (ABC's) Guideline: Volume 1, A Manager's Guide to Analysis of Benefits and Costs
- Analysis of Benefits and Costs (ABC's) Guideline: Volume 2, An Analyst's Handbook for Analysis of Benefits and Costs

Task: **3.6.6**
Conduct Feasibility Study (*as appropriate*)

Description: When a project has decisions or issues that require a more detailed investigation than is possible with a Feasibility Review or Analysis of Benefits and Costs, a Feasibility Study must be performed to obtain the necessary information for making an informed decision about project feasibility. An Analysis of Benefits and Costs (ABC) is a required process in a Feasibility Study.

In cases where the platform is limited or restricted, the Feasibility Study may be abbreviated to evaluate only the technical solutions for the areas that have some flexibility.

Use the information identified in the Feasibility Review and the Analysis of Benefits and Costs as the basis for the Feasibility Study. Consider any preliminary solutions that were formulated and identify the alternative ways to resolve the problems or issues. Evaluate all of the available feasibility factors to determine if the project is technically feasible and cost effective.

Sometimes a Feasibility Study for a similar project has already been conducted. An existing Feasibility Study can be used if the information is current, relevant to the new project, and technically correct.

The following are examples of cases where a Feasibility Study must be performed.

- There is uncertainty or disagreement on the boundaries of the project.
- There is uncertainty over the cost justification or technical feasibility of a project.
- There is a lack of agreement about the goals or approach for building the software product.
- The proposed size or complexity of the software product indicates a high degree of risk.
- The software product will automate functions that currently are not being performed either automatically or manually.

Work Product: The results of the Feasibility Study are reported in a document that describes the process that was used to determine feasibility, the alternatives that were considered, and the results of the Analysis of Benefits and Costs. The Feasibility Study results determine the feasibility recommendation for the project.

Subtasks: The following subtasks are involved in conducting and documenting a Feasibility Study.

- 3.6.6.1 Analyze the alternatives
- 3.6.6.2 Determine feasibility recommendation
- 3.6.6.3 Develop feasibility study document

Note: New software products can be limited to the system owner's and users' existing hardware and software environment, and may not require a Feasibility Study.

Review Process: An informal peer review or a structured walkthrough is recommended to validate the Feasibility Study process used and the results obtained.

Subtask: **3.6.6.1**
Analyze the alternatives

Description: Alternatives for developing and implementing a project are derived from the high-level project requirements, the results of the Feasibility Review and the Analysis of Benefits and Costs, and the preliminary platform options. The analysis of the alternatives forms the basis for determining project feasibility.

The analysis of the alternatives should consider the following types of information.

- The ability of each alternative to achieve the project objectives.
- The ability of each alternative to meet the users' requirements and expectations.
- How well each alternative accommodates the system owner's current processes and resources.
- How cost-effective and technically feasible each alternative is compared to the existing automated or manual process.
- How well each alternative fits with the hardware and software limitations imposed by the system owner.

Analysis of the alternatives may include the following activities.

- Research current computer industry periodicals to obtain articles and reviews about software and hardware alternatives.
- Interview software and hardware vendors to obtain up-to-date information about product releases and future upgrades, capabilities, vendor support, developer training, product demonstrations, multiuser license arrangements, current users, and costs.
- Interview current users of the product to obtain information about user satisfaction, ease-of-use, satisfaction of user expectations, productivity, and product limitations.

Subtask:**3.6.6.2****Determine feasibility recommendations****Description:**

The results of the Feasibility Study are used to determine project feasibility. The feasibility recommendations must be substantiated by the results of the Analysis of Benefits and Costs (ABC).

The feasibility recommendations should include the following types of information.

- The recommended alternative for each of the project automation issues.
- The feasibility to develop the project.
- The most technically sound alternative with the most long-range benefits to the Department.
- The most cost-effective configuration for the project based on the ABC.
- The estimated total lifecycle costs based on the recommended technical solution and the ABC.

Subtask: **3.6.6.3**
Develop feasibility study document

- Description:** The Feasibility Study Document provides the following types of information.
- The process that was used to determine project feasibility.
 - The alternative approaches that were analyzed for achieving the project objectives.
 - The results of the Analysis of Benefits and Costs.
 - The recommendations for a specific approach to meet the system owners' and users' project objectives, automation needs, and expectations.
- Work Product:** The Feasibility Study Document should contain enough information to enable the system owner to make a decision to either continue or terminate the project.
- Review Process:** An informal peer review or a structured walkthrough is recommended to validate the Feasibility Study Document and feasibility recommendations.
- The completion of the Feasibility Study is an appropriate time to schedule an In-Stage Assessment (ISA). The *In-Stage Assessment Process Guide* provides a description and instructions for conducting an ISA. A copy of the guide is provided in Appendix D.